How to: Water Flow in Condensers

March 30, 2015 HgDinis25 Apparatus and Equipment Aquarium, Condenser, Coolant, Flow, Pump

Introduction

Many reactions require the use of a condenser. Any fluid-cooled condenser needs, obviously, a liquid coolant. The most common one is cold water.

What I want to address here is: how to create a flow of said coolant inside the condenser? Surprisingly, the most common and accepted way of doing so is by conecting the condenser to a water tap, open said tap and let the water flow. In my opinion, this method is straightforward bad.

Aquarium Pump

I use a very different method (me and probably many other chemists out there). Instead of using the water tap to provide the flow I use an **aquarium pump**.

Aquarium pumps are used in household aquariums to filter the water (I'm far from being an aquarium master so do correct me if I'm wrong 🙂). The one I use was broken and so I got it for free. It was bought for about 10€.

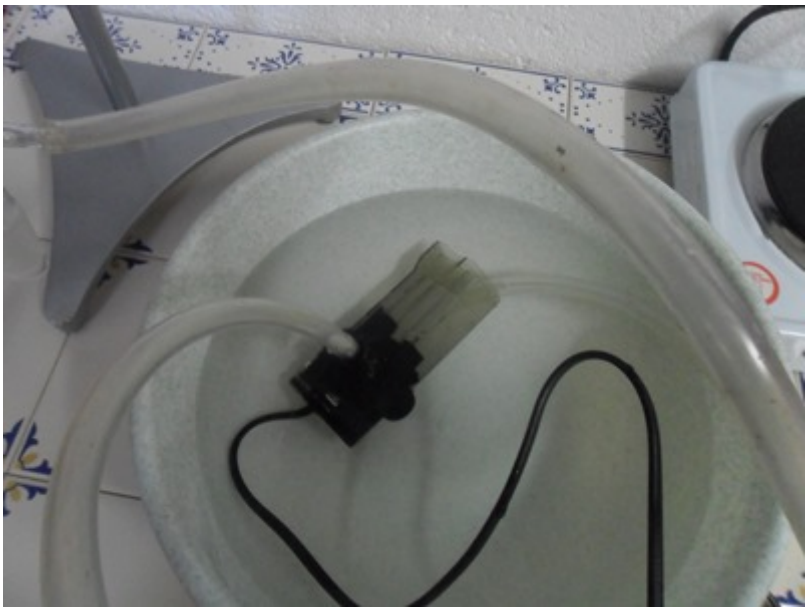
Here are two pictures of my pump:

Set Up

So, how does it work? First, you need a container to hold the water. It can be just about anything (plastic is recommended to decrease heat flow). And you can add some ice if you wish to have very cold water.

You also need your ordinary rubber hose:

The pump has a little hole where water exits. You must adapt one of the rubber hoses to connect there. Mine is just the right size and I just need to push it in.



Attach that hose to the condenser. Attach the other hose to the condenser as well and place it freely in the water container.

Here is a picture of a condenser with this set up running:

Advantages

- You don't waste water. Either because you care about the environment or your monthly bills, you don't waste liters of water just to refrigerate your apparatus.
- You can mount your apparatus wherever you wish. With this system you don't need to be close to a water tap.
- You can control the temperature of the water much more easily. And you can add ice to make the water colder than regular tap water.
- You can use other types of coolants instead of only water. For instance, some reactions may need a coolant that can reach -5ºC or -10ºC.
- For some fun, you can add dye to the water and have some colorful coolant for your condenser…

Disadvantages

- My pump was dirt cheap and it works well. However, some very cheap pumps may not have enough power to pump water into a condenser. Try to buy one in a store that allows you to change the item if it doesn't work properly.

Final Notes

I honestly find this method much better than the regular tap water method. I hope this is of use and please leave some feedback. If you have any doubts, feel free to comment.